

# *New Jersey's Environment*

## 1998



## From the Commissioner

The Department of Environmental Protection is committed to managing New Jersey's environment to ensure clean air, clear waters, safe and plentiful open space, and an overall high quality of life.

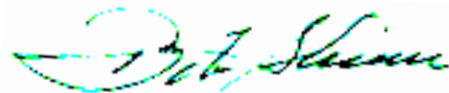
To manage our environment, we must be able to measure it. That means using sound science to assess the current state of our environment, evaluating the effectiveness of past efforts by looking at historic improvement trends, developing goals and strategies for future improvement, and forging partnerships with our constituents to meet our targets.

*New Jersey's Environment 1998* is one of a series of interrelated documents that is helping us do that. This report, the first of its kind in New Jersey, presents a host of environmental indicators — everything from the amount of pollutants emitted into the air to total acres of protected land — that measure the quality of our environment. These indicators also serve as a baseline so that you will be able to chart future progress through subsequent reports.

Detailed plans for how we will achieve that progress can be found in two other important documents: our Strategic Plan, which outlines the major strategies we will emphasize over the next four years and the milestones we intend to achieve, and our Performance Partnership Agreement with the U.S. Environmental Protection Agency (EPA). This two-year agreement, developed under the National Environmental Performance Partnership System, is a much more comprehensive and detailed planning document that outlines the major activities New Jersey and the EPA will jointly undertake for continued environmental improvement.

This report provides the foundation for developing a better understanding of the state of our environment, our long-term goals and the challenges we face in meeting them. Along with the Strategic Plan and Performance Partnership Agreement, it is intended to encourage greater and more informed public participation in environmental decision-making. With the vast amount of information available to the general public through these documents and our computerized Geographic Information System (GIS), there has never been a better opportunity for you to take an active role in the environmental management process.

I encourage you to become a partner in working toward the ultimate goal of a sustainable environment for New Jersey — one that is measurably cleaner, healthier and richer in opportunities to enjoy our wealth of natural resources.



Robert C. Shinn, Jr.



Loretta O'Donnell

*A tour aboard one of DEP's water quality monitoring boats used to sample ocean waters off New Jersey*





## Mission Statement

**Vision:** The Department of Environmental Protection is committed to providing a high quality of life for the residents of New Jersey.

**Mission:** To assist the residents of New Jersey in preserving, sustaining, protecting and enhancing the environment to ensure the integration of high environmental quality, public health and economic vitality. We will accomplish our mission in partnership with the general public, business, environmental community and all levels of government by:

- Developing and integrating an environmental master plan to assist the Department and our partners in decision-making through increased availability of resource data on the Geographic Information System.
- Defining and publishing reasonable, clear and predictable scientifically-based standards.
- Achieving the Department's goals in a manner that encourages compliance and innovation.
- Employing a decision-making process that is open, comprehensive, timely, predictable and efficient.
- Providing residents and visitors with affordable access to safe and clean open space, historic and natural resources.
- Assuring that pollution is prevented in the most efficient and practical way possible.
- Assuring that the best technology is planned and applied to achieve long-term goals.
- Assuring that non-treatable wastes are isolated, managed and controlled.
- Enhancing environmental awareness and stewardship through education and communication.
- Fostering a work environment that attracts and retains dedicated and talented people.
- Committing to an ongoing evaluation of the Department's progress toward achieving our mission.



# Introduction

*"...The State of New Jersey will establish ways to measure our quality of life and report on our progress. We'll let you know about things that matter to you: the quality of our water...and how we're doing in saving open space...."*

*(Second Inaugural Address, Governor Christine Todd Whitman, January 20, 1998)*

*Spruce Run State Park, Hunterdon County, by J.J. Raia*



New Jersey is a national leader in addressing the challenges of environmental protection. Over the past three decades New Jersey has dramatically reduced formerly severe levels of air and water pollution, preserved broad areas of open space and farmlands, and stabilized or increased populations of many endangered species. This progress has been achieved in a state that is small in land area, densely populated and prosperous. New Jersey residents have the opportunity to both participate in a robust economy and enjoy a healthy environment.

New Jersey is the fifth smallest state in the nation with 7,419 square miles of land area. On its borders are Delaware to the south, Pennsylvania to the west, New York to the north and the Atlantic Ocean to the east. The state is home to the Pinelands National Reserve, a unique ecosystem of over 1 million acres containing the internationally recognized "pygmy pine forests." The state currently has over 900,000 acres of publicly owned open space, more than 2,000 species of native plants and at least 800 species of native wildlife including such rare animals as the Pine Barrens tree frog, which is seldom found outside of New Jersey. New Jersey also boasts approximately 6,760 river and border river miles, 1,871 square miles of freshwater and coastal wetlands, bays, estuaries, freshwater lakes and ponds, as well as 127 miles of Atlantic Ocean coastline. New Jersey's farms produce over 80 varieties of fruits, vegetables and other commodities annually.

New Jersey faces numerous environmental management challenges related to its industrial history, the nature of its economy, the paradox of its high population density and sprawling land development patterns, and its many legal/political subdivisions. With a population of 8 million in 1998, the state had an estimated population density of 1,077 people per square mile, making it the most densely populated state in the nation. Based on an estimated average growth rate of 0.5% per year, it is projected that, by the year 2010, New Jersey's population will reach 8,583,550.<sup>1</sup>

High population density results in land use changes and pollution from many scattered sources, such as rain washing oil from streets and pesticides from lawns into storm drains. This is referred to as "nonpoint source pollution." The tailpipe emissions from cars and trucks also contribute to this problem. The 35,600 miles of

roads in New Jersey are traveled by 5.9 million passenger cars registered here and by countless visitors.<sup>2</sup>

New Jersey has a rich industrial history that lives on today. New Jersey ranks 10th nationally in the manufacture of durable and nondurable goods and is 14th in exports by state of origin. There are approximately 700 manufacturing industries in such diverse fields as pharmaceuticals, agricultural fertilizers, solvents, cleaners and paints at work in New Jersey. In addition, five major petroleum refineries produce gasoline, motor oil, asphalt and lubricants in New Jersey. Construction, transportation, utilities, wholesale and retail trade, finance, insurance, real estate, agriculture and the military services are all major employers within New Jersey and all create potential stresses to the state's air, water and natural resources.

Other challenges to maintaining a healthy environment include over 8,900 hazardous waste sites, including 105 active Superfund sites, that are in some stage of cleanup. There are also 14 operating landfills, approximately 300 municipal and 800 industrial wastewater treatment plants, seven electric and natural gas distribution utility companies, four nuclear reactor facilities and five major coal-fired power plants within the state.

In response to these challenges, the New Jersey Department of Environmental Protection (NJDEP) has implemented comprehensive and innovative environmental policies and programs. Created on Earth Day 1970, NJDEP is responsible for both pollution regulation and preservation of natural and historic resources.



*Governor Whitman and Commissioner Shinn on the Wading River in the Pinelands*

- Many of NJDEP's efforts have earned national recognition. Examples include:
- a comprehensive mandatory recycling program
  - the first state program to monitor and regulate toxic synthetic organic contaminants in public water supplies
  - a leadership role in the development of the National Environmental Performance Partnership System (NEPPS). NEPPS is an environmental management partnership with the federal government that sets long-term goals for improving New Jersey's air, land and water, and develops environmental indicators to measure environmental quality and progress. New Jersey was one of the primary architects of NEPPS, as well as one of the first six states to participate in the program.
  - extensive use of the Geographic Information System (GIS), a computerized mapping system, as a decision making tool
  - provision of grants and loans to accomplish the dual goals of hazardous site remediation and economic vitality
  - issuance of the first comprehensive facility-wide permit in the nation that covers an industrial facility's releases to air, water and waste
  - one of the most effective state environmental research and technical support programs in the country (according to the National Governors' Association) that has continued to meet NJDEP's critical information needs and offer innovative solutions to New Jersey's environmental challenges.

Currently, New Jersey is pursuing the concept of sustainability in its environmental protection efforts. Sustainability has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."<sup>3</sup> Governor Whitman's Executive Order #68, issued on Earth Day 1997, directs each state department to promote sustainability as a working philosophy and to embrace sustainability as an operating principle. In accordance with this Executive Order, sustainability and sustainable communities concepts are being integrated into NJDEP initiatives and day-to-day practices through coordinated efforts with the New Jersey Office of Sustainability and New Jersey Future, a non-profit organization that is developing sustainability goals and indicators for the 21st century.

Additionally, all state departments are implementing the State Development and Redevelopment Plan. The Plan, originally approved by the State Planning Commission in 1992, provides a strategic framework for controlling suburban sprawl, redirecting investment into urban renewal, preserving open space and farmland, and generally improving the quality of life for current and future generations. The central organizing principle of the Plan is "Communities of Place," emphasizing compact forms of development in various size centers with protection of open space surrounding the centers.

This report provides general information on past trends and current environmental conditions in New Jersey. It also details the many daily activities that we as citizens participate in that can harm the environment as well as ways in which to reduce or eliminate those behaviors. Whether as individuals or as communities, we all influence the health of New Jersey's environment. By working together and taking personal responsibility, we can all play a greater role in improving environmental conditions and the quality of life in New Jersey.

#### **For additional information about New Jersey's environment or NJDEP:**

- **Search** the NJDEP web site ([www.state.nj.us/dep](http://www.state.nj.us/dep)). Specific information on environmental indicators can be found at the Division of Science and Research's web site ([www.state.nj.us/dep/dsr](http://www.state.nj.us/dep/dsr))
- **Connect** to the NJDEP Bulletin Board System (609-292-2006)
- **Call** the NJDEP general information number (609-777-3373)
- **Visit** the Public Access Center at NJDEP Headquarters (401 E. State St., Trenton, 1st Floor)
- **Participate** in NJDEP's numerous public involvement opportunities, including meetings to develop environmental goals and measures of progress for New Jersey through the National Environmental Performance Partnership System (NEPPS)

1 1997 Reexamination Report. Communities of Place. The New Jersey State Development and Redevelopment Plan: Reexamination Report and Preliminary Plan. New Jersey State Planning Commission. June 25, 1997.

2 Ibid.

3 "Our Common Future," The World Commission on Environment and Development, 1987





# Air Quality

*GOAL: The air throughout the state will be healthful to breathe, and air pollutants will not damage our forests, land and water bodies.*

*Robinson Reservoir, Union County, by J.J. Raia*

*Children are among the most vulnerable to poor air quality; by Valerie Kraml*

## Importance of Clean Air

Many pollutants, both man-made and naturally occurring, harm air quality in New Jersey. Air quality in the state varies significantly depending on location, time and weather conditions. Over the past 30 years, as sources of air pollution have been identified and solutions implemented, air quality in New Jersey has improved. However, widespread exposure to high ozone levels in the summer and potential exposure to toxic air pollutants in localized areas are still serious concerns because of their potential effects on human health.

Nationally, air quality health standards have been set for six of the most common air pollutants — ground-level ozone, particulates, carbon monoxide, sulfur dioxide, nitrogen dioxide and lead. These pollutants can damage the respiratory system, as well as other organs. In particular, exposure to ozone can cause coughing, chest pain and throat irritation in healthy individuals, and can trigger asthmatic reactions in sensitive individuals.

While there are no fixed boundaries limiting the spread of air pollution, geographic air sheds have been

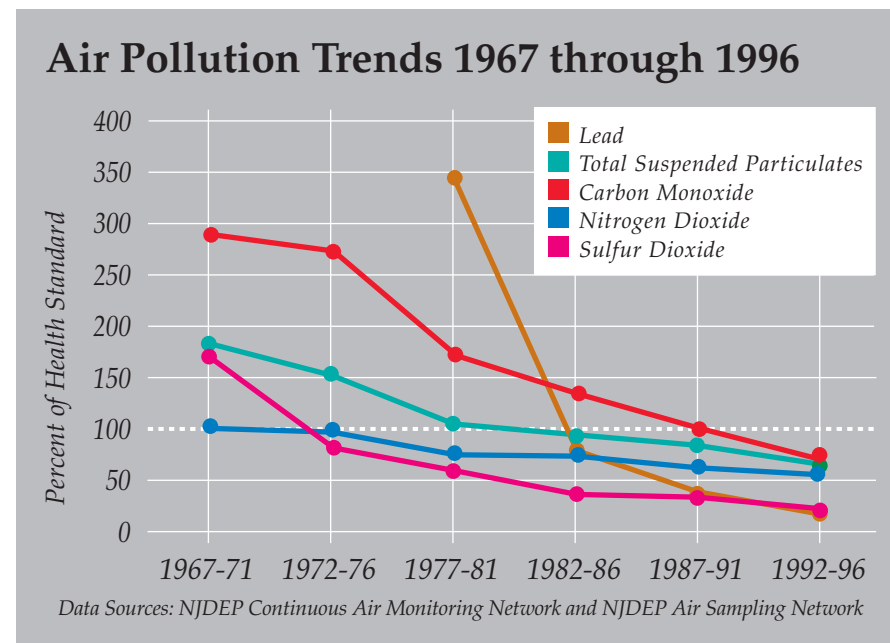
defined (based on demographics, travel patterns and other factors) for developing strategies to control air pollution. New Jersey is part of four major air sheds, each of which is associated with a metropolitan area (New York, Philadelphia, Atlantic City and Allentown - Bethlehem). Within each air shed, air quality is affected both by local emissions and by pollution that is transported into the area by the prevailing winds. Transported air pollution is a serious problem for New Jersey, just as pollution from New Jersey affects areas downwind.

Since air pollutants can be transported across jurisdictional lines, a regional approach to solving air pollution problems is necessary. NJDEP has worked with other states to address these problems, taking a leadership role in groups such as the Ozone Transport Commission (OTC) and the Ozone Transport Assessment Group (OTAG). New Jersey has developed regional strategies in cooperation with other member states of these groups and is committed to taking all reasonable steps to coordinate with other states to implement strategies to reduce the transport of ozone air pollution throughout the eastern United States.

Within New Jersey there are many air pollution sources. These can generally be categorized as mobile sources (cars, trucks and buses), stationary sources (chemical factories, sewage treatment plants, power plants, etc.) and area sources (consumer products such as paints and cleaning products, as well as gasoline stations and the combustion of heating oil to warm a home or heat water for use). In addition to affecting air quality, the pollutants emitted by these sources can harm water quality and ecosystem health.

Indoor air pollution is also a concern. Radon is a naturally occurring radioactive gas. It is a decay product of uranium and is found in soil everywhere in varying concentrations. Radon gas moves through the soil beneath a building and may seep through cracks or other openings in the foundation. Just as radon is produced from the decay of radioactive materials, it further decays, producing new radioactive materials in the form of solids. These radon decay products can attach to other indoor air particles, such as dust and cigarette smoke.

Figure 1





When inhaled they become trapped in the lungs, where they emit radiation. These decay products can damage lung tissue and increase the risk of lung cancer. In fact, long term chronic exposure to this invisible, odorless radioactive gas is the second leading cause of lung cancer in the United States. In New Jersey, radon is estimated to be responsible for up to 500 lung cancer deaths each year.

### Status and Trends

Programs to reduce pollution from industry and automobiles have largely addressed New Jersey's simplest air pollution problems. Air concentrations of the six pollutants for which the U.S. Environmental Protection Agency (USEPA) has set health standards have declined in New Jersey over the past 20 years, so that we now meet most of the health standards (**Figure 1**).

The air pollution problems facing us now are much more complex. Ground-level ozone — not to be confused with the ozone found in the stratosphere that shields us from the sun's harmful ultraviolet radiation — is one example. Unlike other pollutants, the ozone found in the lower atmosphere is not emitted directly. Reducing ozone at ground level where we breathe

requires reducing the chemicals that combine to form ozone. These chemicals, or precursors to ozone, can be transported by the wind for many miles and may come from sources in other parts of the country. When added to our local emissions, these pollutants can cause unhealthy air quality levels with the right weather conditions, such as warm temperatures and light winds.

Some pollutants, such as mercury emissions from combustion, manufacturing and other sources, do not pose serious air problems when they are in the outdoor air. However, when they deposit on the land and water, they can pollute our water-bodies, threaten aquatic life and accumulate in fish. Other pollutants, like carbon dioxide, contribute to global climate change and the related concerns of sea-level rise, ecological shifts and disruption of agriculture.

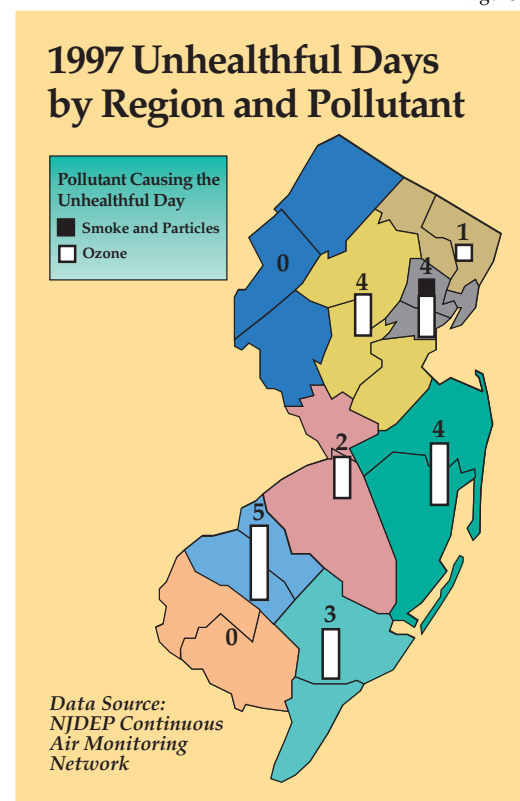
Overall, air quality in New Jersey has been improving, with far fewer unhealthy air quality days (11) in 1997 than in the late 1980s when the number of unhealthy days was regularly 30 or more each year. **Figure 2** shows the number of unhealthy days in each region of the state by pollutant. On some days, unhealthy air quality is reached in more than one

region; therefore, the sum of each of the regional values exceeds the statewide number of 11 days.

New Jersey met air quality health standards throughout 1997 for four of the six major air pollutants; the exceptions were ozone and total suspended particulates. During the summer of 1997, New Jersey exceeded the one-hour health standard for ground-level ozone, commonly known as smog, on only 10 days (**Figure 3**). Prior to 1989, the number of unhealthy days from elevated ozone levels was always 20 or more. There were 60 unhealthy days in 1983.

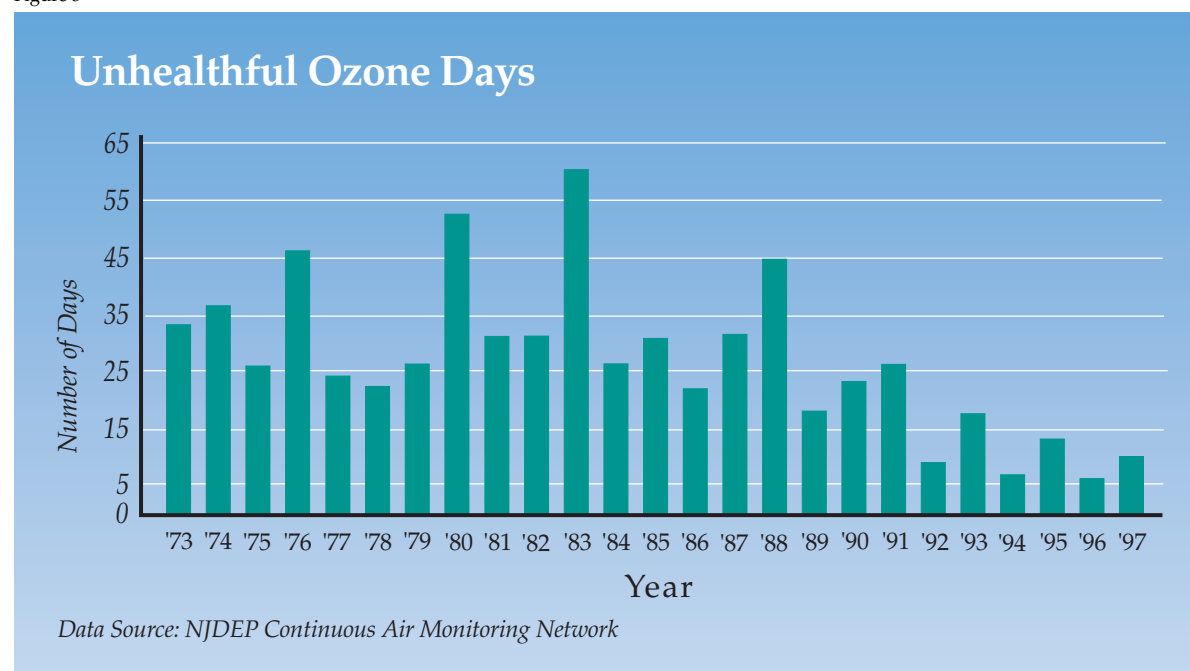
Many strategies have been employed to reduce ozone air pollution. Gasoline has been reformulated to burn cleaner and evaporate less readily. New cars pollute much less than older cars, and all cars must have their emissions checked periodically. Emissions from industrial and utility sources have also been dramatically reduced. However, exposure to ozone is still of great concern since almost 4 million people in the state were potentially exposed to unhealthy levels at some time in 1997.

Figure 2



Four counties and three municipalities in the northeastern portion of the state still are officially designated as not attaining the carbon monoxide health standard. However, in 1997, for the third consecutive year, New Jersey recorded no unhealthy days due to elevated carbon monoxide levels in these counties and municipalities. The rest of the state also continues to comply with the standard. Two years

Figure 3



without exceeding the health standard is a prerequisite for declaring the area officially in compliance with the health standard. NJDEP is working with neighboring states that are part of the air shed to officially redesignate the area as attaining the carbon monoxide health standard.

Air pollution from industry and mobile sources has been greatly reduced thanks to more efficient manufacturing processes, removal of pollutant source materials and improved methods for removing contaminants before they are

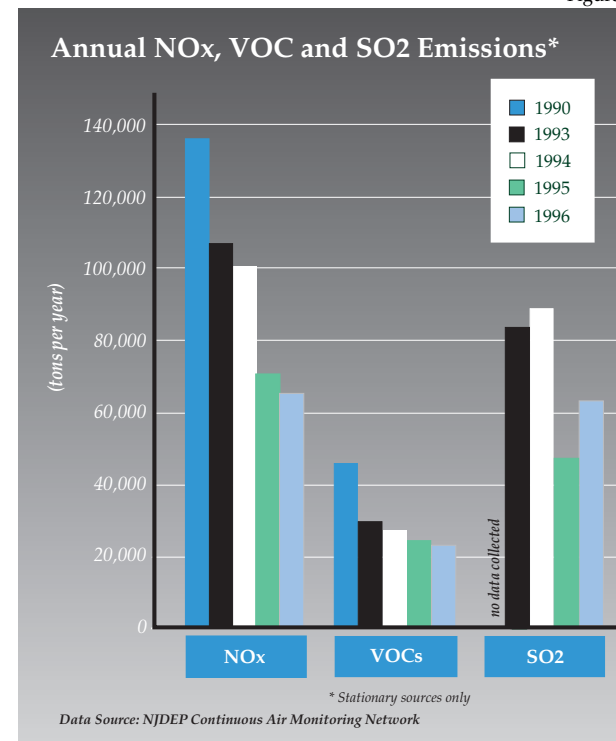
released to the air. Since 1990, significant reductions have been seen in industrial emissions of two types of smog-forming pollutants — volatile organic contaminants (VOCs) and nitrogen oxides (NOx) (**Figure 4**). Federally mandated acid rain controls have also reduced sulfur dioxide (SO<sub>2</sub>) in New Jersey and other neighboring states.

In 1994, NJDEP adopted the nation's strictest mercury emission rules for trash incinerators. Since then, mercury emissions from New Jersey's five

incinerators have declined 80 percent (**Figure 5**). Lead concentrations found in the air have also declined substantially since the phaseout (beginning in 1976) of lead as a gasoline additive.

Regarding indoor radon, a measurement test can determine if a building has elevated radon levels. During 1997, approximately 49,500 radon tests were conducted and 2,500 radon mitigation systems were installed (**Figure 6**). The radon testing rate has remained steady

Figure 4

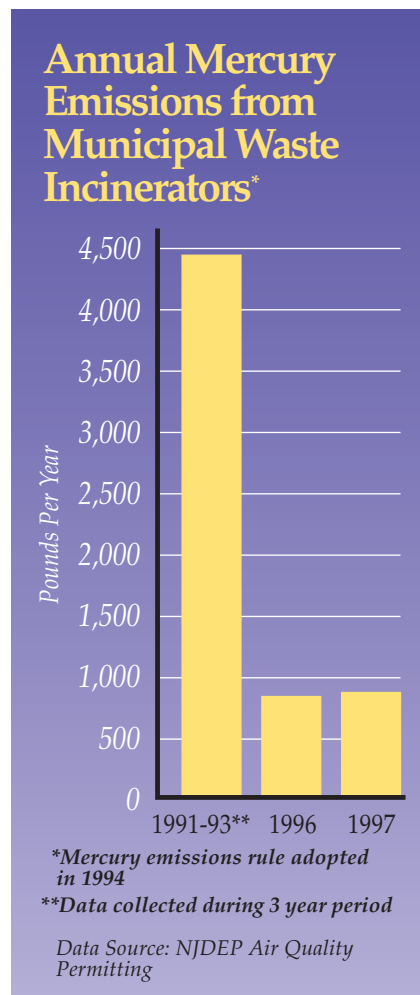


from 1992 through 1997 while the number of radon mitigation installations has generally increased.

### What's New: Air Standards and Global Climate Change

The federal Clean Air Act requires the USEPA to review the air quality health standards every five years to determine whether, based on current research, those standards are protective of human health. Based on the

Figure 5



latest information, the USEPA promulgated changes to the health standards for ground-level ozone and particulate matter in 1997. New Jersey is required to meet the health standards as soon as possible, but not later than 2010 and

2015, respectively, for ozone and particulate matter.

The ozone standard was changed because these studies showed that human health is harmed at ozone levels lower than the current one-hour standard if the ozone levels remain high for at least 8 hours. The old one-hour standard was exceeded on just 10 days during the summer of 1997, while ozone levels were above the new eight-hour standard on 35 days that year. Meeting this new standard will be difficult, but it will provide a greater margin of public health protection, and New Jersey is already positioning itself to meet this challenge.

Under the former health standard for particulate matter, the health effects were thought to be associated with particles 10 micrometers in diameter or smaller. (A human hair is approximately 70 micrometers in diameter.) The USEPA's new health standard is based on particles 2.5 micrometers or smaller. These smaller particles are inhaled more deeply into the lungs and are thought to cause many of the adverse health effects. The entire state of New Jersey meets the health standard that was set for the 10 micrometer particles. It is estimated that much of the state will not meet the

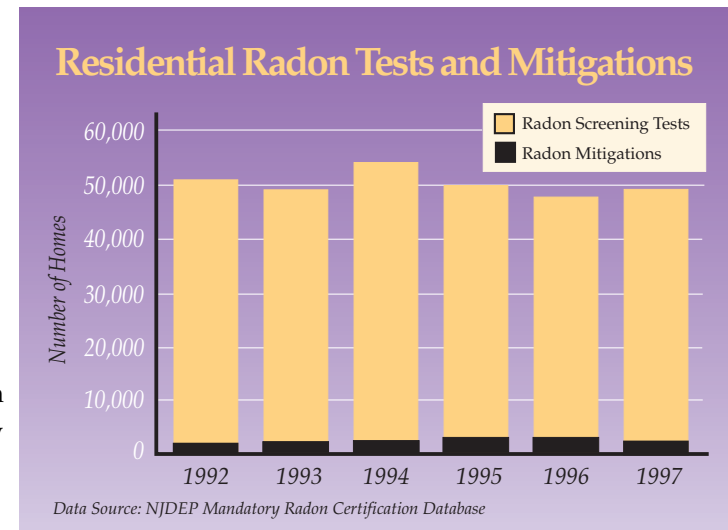
new standard for 2.5

micrometer particles, but we will not know for certain until we have data from the monitoring program which gets under way in 1998. In anticipation of the 2.5

micrometer particle standard, New Jersey is implementing a heavy duty diesel truck inspection program in 1998 to reduce smoke emissions.

NJDEP is also assessing the long-term environmental and economic implications of greenhouse gases. Left unchecked, increasing concentrations of greenhouse gases may contribute to rising sea levels, warmer temperatures, more arid soils, and more frequent and intense storms. An inventory of all New Jersey greenhouse gas emissions, by gas and market sector, is now complete. This inventory indicates that New Jersey is responsible for approximately 2 percent of the nation's greenhouse gas emissions. An action

Figure 6



plan to reduce emissions of carbon dioxide and other greenhouse gases is under development with help from parties throughout the state. Specific policy recommendations in the areas of transportation, building emissions reductions, and industrial manufacturing are being formulated. Programs to promote the benefits of utilizing innovative technologies such as geothermal energy, fuel cells and solar design are under development. Efforts to educate the public about the facts and consequences of climate change are also under way.



### *To find out what the daily air quality is like in your area:*

Look in your local newspaper

Call the Air Quality Index & Regional Forecast toll-free number (1-800-782-0160)

View NJN TV nightly news

Search the World Wide Web ([www.state.nj.us/dep/airmon/index.htm](http://www.state.nj.us/dep/airmon/index.htm))

Connect to NJDEP's Electronic Bulletin Board (609-292-2006)

*Reflections on Lake Absegami, Bass River State Park, Burlington County, by J.J. Raia*

### *What can you do?*

■ **Drive Less.** Collectively, automobiles are the largest cause of air pollution in the state. Try using mass transit, carpooling, walking or riding a bike. Combine trips when you do use your car. When shopping for a new car, look for the most fuel efficient and lowest emitting model available.

■ **Conserve Energy.** Almost all of the energy we use comes from the burning of fuel, whether in our cars, in our homes or at the power plant supplying electricity to our homes. The more efficiently we use energy, the less pollution, so turn off unneeded lights, use a fan instead of an air conditioner whenever possible and consider energy efficiency when purchasing new appliances.

■ **Maintain Your Car Properly.** Keep your car tuned, get it inspected when due and keep your tires properly inflated. You'll get better gas mileage, too.

■ **Delay Yard Chores.** Those gas powered yard tools are big polluters. Don't mow your lawn or use other gas powered tools on days when ozone is expected to be high. Consider using electric tools. They pollute far less and are quieter.

■ **Use Products That Pollute Less.** The volatile organic compounds (VOCs) in consumer products, such as paints and household cleaners, quickly evaporate and contribute to ozone pollution. Substitute water-based products whenever possible.

■ **Don't exercise outside** on days when air quality is unhealthy. Check the air quality forecast, especially on sunny, hot summer afternoons.

■ **Test Your Home for Radon and Mitigate if Necessary.** Inexpensive test devices can be purchased at hardware stores or local health departments, or a New Jersey-certified radon measurement business may be hired to conduct the testing. All homes, including those with slab-on-grade construction, should be tested. The NJDEP recommends mitigation if the radon concentration in your home is 4 pCi/L or greater. House repairs can be simple and affordable, starting at just a few dollars for do-it-yourself applied sealers, to a professionally installed mitigation system ranging in cost between \$500 and \$2,000. All businesses and individuals that provide professional mitigation installations must be certified by New Jersey.

■ **Call the Radon Information Line** at 1-800-648-0394 or **visit the NJDEP Radon Web Page** at [www.state.nj.us/dep/rpp/index.htm](http://www.state.nj.us/dep/rpp/index.htm) for further information on radon.



# Water

*GOAL: New Jersey's rivers, lakes and coastal waters will be fishable, swimmable and support healthy ecosystems. Ground water will be a clean source of water. Every person in New Jersey will have safe drinking water. Adequate quantities of surface and ground water will be available for all needed uses.*

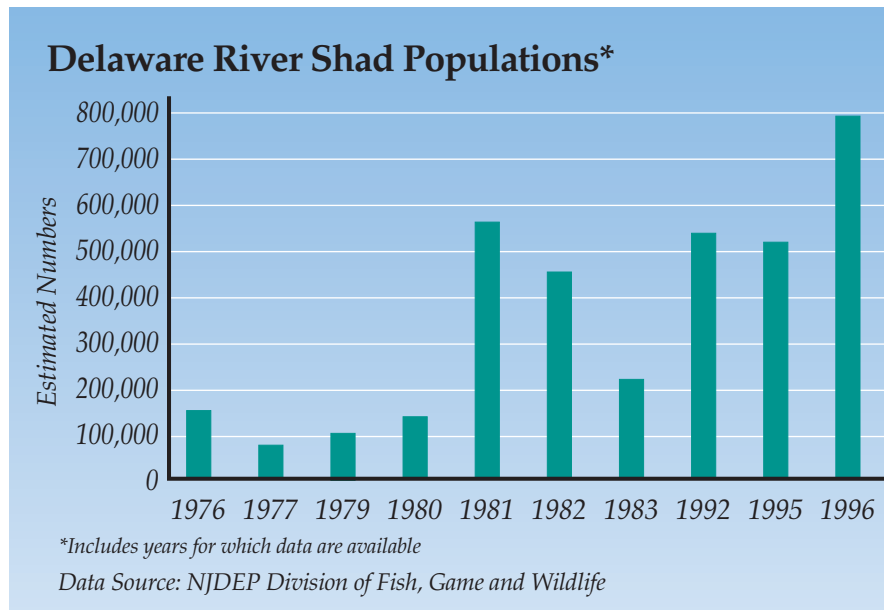
*South Fork of the Raritan River, Ken Lockwood Gorge, Hunterdon County, by J.J. Raia  
A fisherman casts a line at Wawayanda State Park, Sussex County; by Alyce Parseghian*



## Surface Water

New Jersey's surface waters provide habitat and food for numerous species of wildlife and are an important source of drinking water and food for residents. Over 173 million pounds of fish and 75 million pounds of shellfish are harvested from New Jersey's coastal waters each year. Fishing, swimming and boating are favorite pastimes and are important to the tourism industry. Tourism in New Jersey coastal counties is a \$12 billion industry that employs hundreds of thousands of people. Clean water is

Figure 7



important economically and ecologically to the well-being of New Jersey.

Surface water quality has remained excellent in undeveloped areas such as the Pinelands and the Delaware Water Gap. Populations of shad in the Delaware River have improved considerably as the water has become cleaner and oxygen levels have improved (**Figure 7**). Over 86 percent of available shellfish beds are open to harvesting due to point and nonpoint source pollution control efforts (**Figure 8**). Harvest areas that are open continually, open seasonally, open with special restrictions and closed are

shown on the shellfish growing area map (**Figure 9**). Notably, effective

pollution control programs have allowed the shellfish industry to thrive once more on the Navesink River in Monmouth County.

Beach closings due to pollution are far less frequent than in

years past because of improvements in sewage treatment and shoreline maintenance (**Figure 10**). Prior to 1991, 450 dry tons of sewage sludge were dumped in the ocean per day. Today, over 60 percent of sewage sludge is

beneficially used to fertilize crops, support landscaping activities and to reclaim damaged land due to successful efforts to prevent toxics from tainting the sludge. Much of this progress is the result of the \$5 billion spent since 1972 to improve sewage treatment. Through an advanced pretreatment program, significant improvements have also been made to prevent or

reduce industrial pollution and to improve treatment of industrial wastewater.

Watersheds are "nature's boundaries," encompassing the areas of land that drain into a body of water such as

*Hard clams are one of the most common types of shellfish harvested from New Jersey's bay waters.*



Bonnie Zimmer

Figure 8

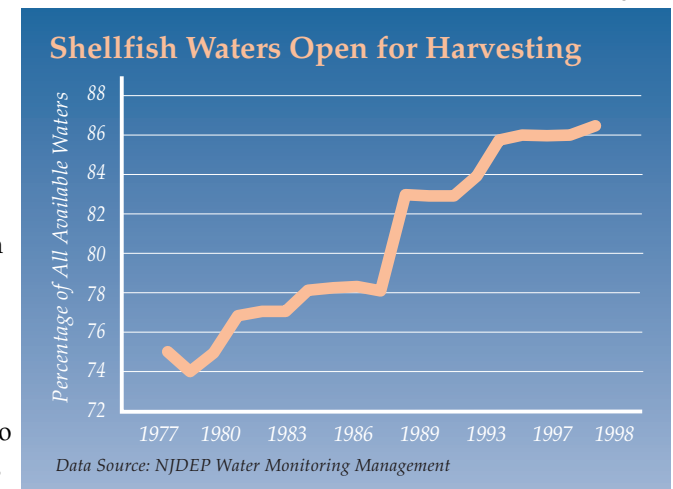
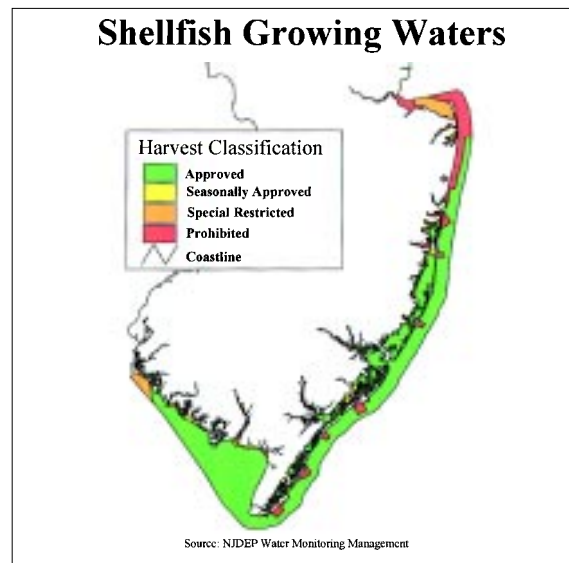




Figure 9



a river, lake, stream or bay. A watershed includes both the waterway and the entire land area that drains into it. We all live in a watershed. There are 96 watersheds in New Jersey that have been grouped into 20 watershed management areas (**Figure 11**). New Jersey is embarking on a watershed management approach to help communities and government work together to identify the issues and needs in each watershed and watershed management area so we can continue to improve, protect and maintain our state's water resources.

Despite significant improvements, many watersheds are harmed by

various kinds of pollution. Some lakes and rivers have become overgrown with weeds and filled in with sediment. Fish kills sometimes occur. Consumption advisories are in effect for some fish species due to toxic contamination. Erosion sends sediments into lakes and harbors, which then require dredging. Bacteria, particularly from stormwater, may at times force closures of beaches

and shellfish beds.

So far, management strategies have focused on wastewater from factories and sewage treatment plants. As these point sources of pollution have been managed, nonpoint source and stormwater pollutants have become significant concerns. Nonpoint source pollution includes all sources of water pollution that do not come from a pipe. Nonpoint contamination of our ground water, rivers and ocean results from activities such as fertilizing lawns and golf courses, walking pets, improper disposal of used motor oil and littering. With each rainfall, pollutants generated by these activities

are washed into storm drains that flow into our waterways and ocean. In some places, high volumes of stormwater lead to frequent flooding. Wetlands can absorb floodwaters and filter polluted stormwater, but these benefits are lost if wetlands are filled or otherwise disturbed.

Populations of aquatic insect larvae and other organisms that live in stream beds have been used to evaluate the health of aquatic ecosystems at over

**803** 700 stream locations statewide. The organisms convey information about the health of the aquatic ecosystems

and are a primary food source for fish. These bottom-dwelling organisms act as indicators, like the canary in a coal mine, because they respond to improving or degrading conditions faster than fish populations. Monitoring of these bottom-dwellers has shown that about 35 percent of New Jersey streams are not stressed, and the remainder are showing moderate or severe stress (**Figure 12**). These results were used to set a milestone (target) to increase the stream miles which are not stressed from 35 percent to 50 percent by the year 2005; this milestone was established by NJDEP in partnership with stakeholders including the regulated community, environmental groups, citizens and academics.

Figure 10

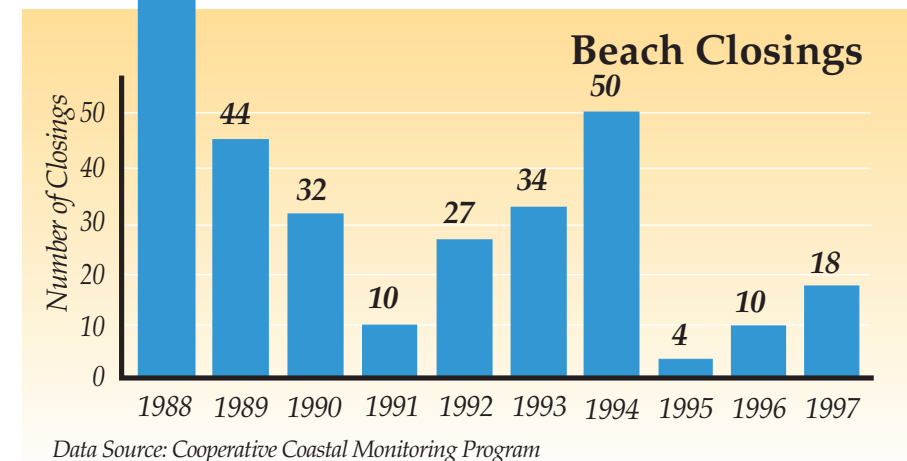
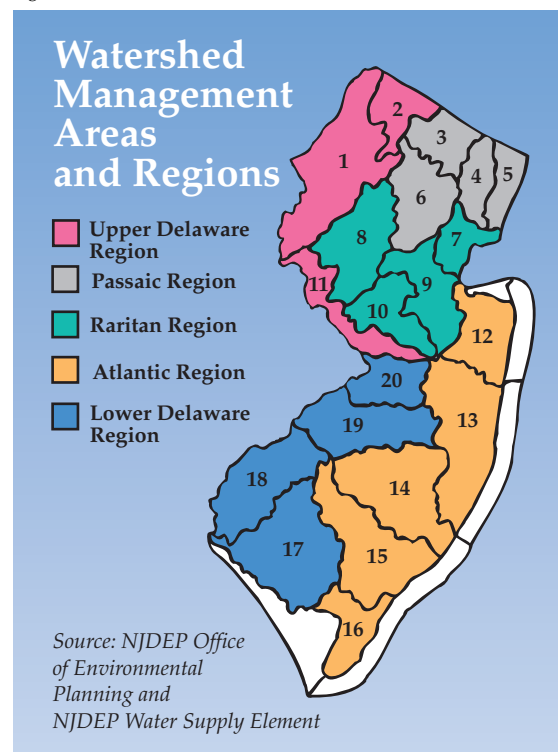


Figure 11



The health of aquatic ecosystems reflects stresses caused by a variety of impacts including chemical pollution and habitat degradation. Aquatic habitats can be degraded in several ways: stormwater can erode stream banks; eroded sediments can be deposited elsewhere, smothering aquatic plants and organisms; and streams may be channeled for flood control or development, removing the physical habitats used by aquatic

organisms. While chemical pollutants in New Jersey streams and sediments have been monitored for a number of years, the evaluation of stream habitat is now beginning.

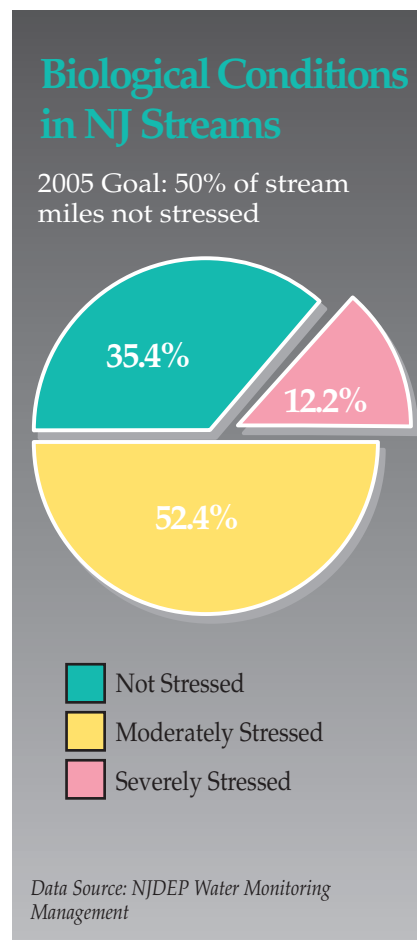
### Ground Water

Ground water is a hidden resource. This buried water comes primarily from rainwater trickling through soil. Ground water generally moves very slowly toward streams, lakes and bays. It is an important source of drinking water and helps sustain streams, lakes and wetlands, particularly during dry

weather. Therefore, the quality of ground water influences surface water quality and the health of aquatic ecosystems. This is of particular significance in the New Jersey Atlantic Coastal Region and portions of the Lower Delaware Region (see Figure 11), where up to 90 percent of the base flow to these streams is from ground water sources.

Ground water quality is generally very good in New Jersey. Industrial

Figure 12



and commercial discharges to ground water are managed to protect ground water from point sources of pollution, such as leaking underground storage tanks. However, in some locations, ground water is contaminated by nonpoint sources and naturally occurring contaminants. Nonpoint sources of

ground water pollution include excess fertilizers and pesticides.

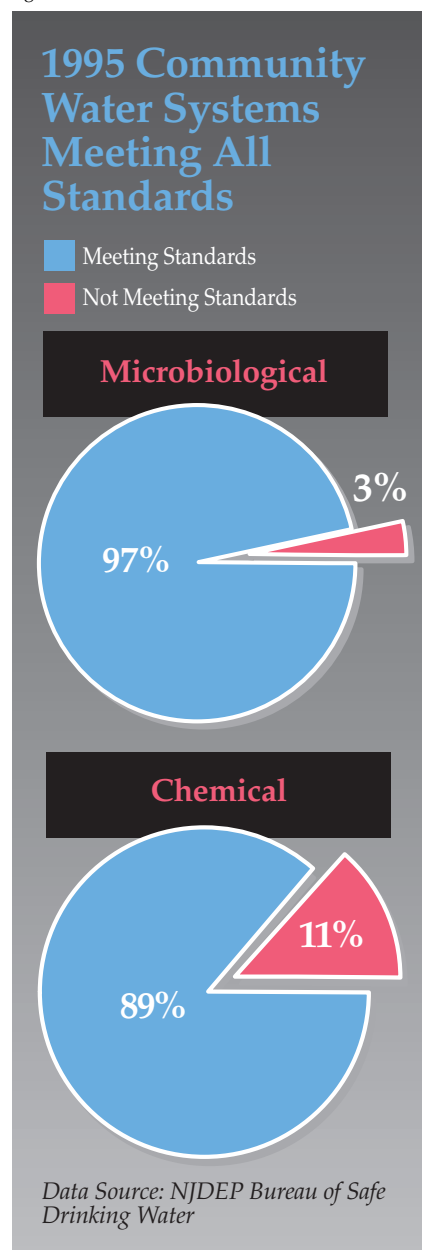
Additionally, some contaminants, such as radon and radium, occur naturally in ground water and can occur at levels that are a human health concern if the water is used for drinking water. Elevated levels of mercury have been found in numerous private drinking water wells tapped into the Kirkwood-Cohansey aquifer system located in the Coastal Plain of southern New Jersey. Contamination by bacteria is also a concern if ground water supplies drinking water to private wells.

### Drinking Water

A major use of New Jersey's water resources is for drinking water supply. About 1.2 billion gallons of potable water are used in New Jersey each day. In New Jersey, 87 percent of the state's population receives its drinking water from public water systems, while 13 percent is supplied by private residential wells. About half of the state's population receives its drinking water from surface water, the rest from ground water.

Drinking water is a direct route of potential human exposure to microbiological and chemical contaminants. To

Figure 13



protect public health, both EPA and NJDEP have set standards for approximately 90 contaminants. Public water suppliers must monitor for these regulated contaminants, based on the type of water system and the source of the drinking water. Public water systems that serve homes are called community water systems. In 1995, 97 percent of the community water systems in New Jersey met all of the microbiological standards and 89 percent met all of the chemical standards (Figure 13).

New Jersey has focused particular attention on reducing exposure to 22 volatile organic chemicals, which include solvents, degreasers and components of gasoline. Many chemicals in this group are considered to be known or probable human carcinogens. In 1983, the New Jersey Legislature gave NJDEP the authority to require semiannual monitoring and the responsibility of developing the standards or MCLs (maximum contaminant levels) for these contaminants in community water systems. Initially, levels of at least one volatile organic chemical were greater than the relevant standard at 20 percent of the community water systems. By 1997, only 7 percent of community water

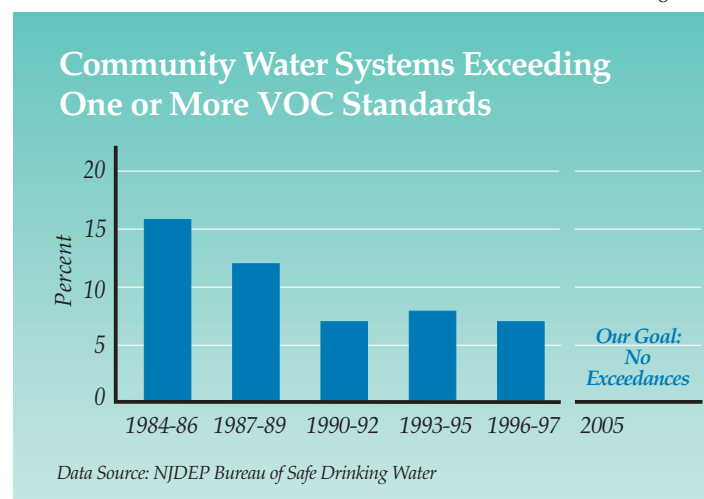
systems did not meet the standard for all volatile organic chemicals (Figure 14).

About 400,000 private wells in New Jersey serve approximately 1.5 million people. All private wells are required to be tested for microbiological contamination and a limited number of other chemicals (e.g., nitrate) when a well is drilled, but thereafter, regular monitoring is the responsibility of the homeowner. Some county and local health departments require retesting of the well when the property is sold.

### Plentiful Water

New Jersey's homes, industries, businesses and farmers use about 1.5 billion gallons of water each day. The system of reservoirs, surface water intakes and wells generally provides adequate supplies of water for all uses. However, as described in the 1996 New Jersey Statewide Water Supply Plan,

Figure 14

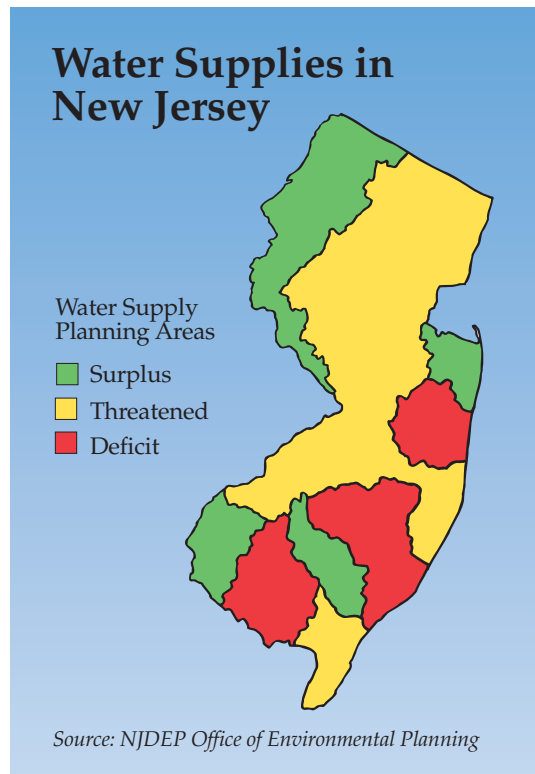


water supplies are regional, and some regions have significant surpluses while others have significant deficits (Figure 15). Those regions for which current surpluses may turn to deficits are shown in yellow on the map and categorized as areas with "Projected Future Deficits." Deficits are generally addressed by conservation, improving local water management, transferring water from one area to another, or developing a new supply.

The long-term trend is toward greater stress on all water supplies, especially in developing areas. As development covers land with roads, parking lots and houses, the amount of rain water reaching ground water is declining. In addition, more than half



Figure 15



of the water used in the state is used only once, then discharged to tidal waters as treated wastewater. In the future, demands for water may exceed supplies in regions where surpluses currently exist. In some locations, poor quality of surface and ground water limits its use for drinking and other purposes. For example, as water use has increased in some coastal communities, saltwater is being drawn into drinking water supply wells. Surface

water pollution is threatening water supplies in several northern New Jersey areas.

### *Strategies to Protect and Enhance Water Resources*

Through statewide watershed management, New Jersey is implementing an integrated approach to maintain existing high quality surface and ground waters, clean polluted waters and enhance water supply protection measures. The issues affecting each of the 20 watershed management areas (see Figure 11) are being identified and will be prioritized. Partnerships with

municipal, county, state and federal governments, business and industry, environmental groups and citizens are being established. NJDEP and its partners will develop watershed management plans for each of the 20 watershed management areas. The goal is to work with the watershed communities to reduce point and nonpoint sources of pollution to improve and enhance water resources for human and ecosystem use.

### *What can you do?*

- **Conserve** water at work and at home. Install flow restrictors on all faucets and use low-flow shower devices. Do not let the water run when washing cars. Minimize lawn watering.
- **Read and follow** pesticide and fertilizer label instructions and precautions. Use fertilizers and pesticides carefully and appropriately. Reduce pesticide use by implementing alternative pest control methods such as biological and mechanical controls, sanitation, monitoring of pests and selective use of the least hazardous pesticides when needed. Do not apply fertilizer or pesticides before a heavy rain.
- **Dispose** of used motor oil and cooling fluids at designated recycling centers. Do not dispose of any hazardous materials or wastes in storm or home drains. Bring toxic household wastes to county hazardous waste collection centers on designated days.
- **Be sure** that your motor vehicle does not leak any fluids. These petroleum products have a major impact on surface and ground water.
- **Clean up** after pets to reduce bacterial contamination in stormwater. Dispose of wastes in the garbage or toilet.
- **Participate** in watershed management activities, including developing watershed management plans. These activities will begin in each of the 20 watershed management areas over the next two years.
- **Join** local watershed associations, environmental groups or other service organizations involved in water resource activities. Participate in monitoring, litter clean-ups, stream bank and wetlands restoration projects, and educational activities.
- **Participate** in local efforts to improve land use planning and land conservation.
- **Look** for additional information about water quality in Statewide Water Quality Inventory Reports and the 1996 State Water Supply Plan. These publications are available at state repository libraries or through NJDEP's Maps and Publications Office (609-777-1038). National and state water quality information is available at EPA's "Surf Your Watershed" website at [www.epa.gov/surf](http://www.epa.gov/surf).
- **Contact** your local drinking water purveyor or NJDEP's Bureau of Safe Drinking Water (609-292-5550) to get information on the quality of your drinking water.
- **Request** copies of the NJDEP publication "The Clean Water Book: Lifestyle Choices for Water Resource Protection" (609-292-2113). It describes many actions individuals can take to prevent water pollution.



# Land and Natural Resources

*GOAL: The health, diversity and integrity of New Jersey's natural resources will be restored and sustained. Natural and scenic landscapes will be preserved and every person will have the opportunity to visit an abundance of well-maintained parks, forests, wildlife areas and historic sites. The public will learn about natural and historic resources and have access to a wide variety of recreational experiences.*

*Dogwood near the Delaware and Raritan Canal, Somerset County, by J.J. Raia*

*Young hikers on High Mountain, Passaic County, by Marc C. Wuensch*

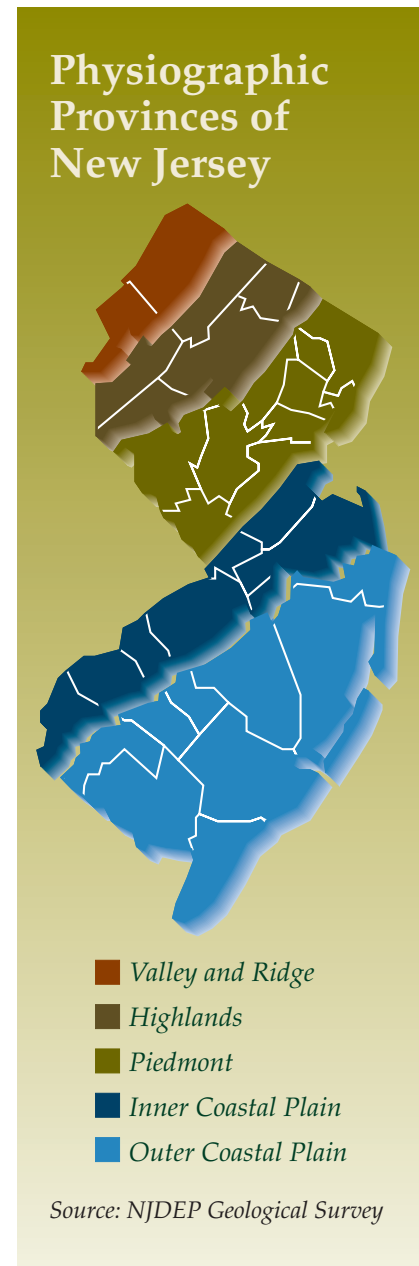


## Healthy Ecosystems

Though New Jersey is one of the smallest and most densely populated states in the United States, it is ecologically unique. The state overlaps very different northern and southern plant and animal communities. Its ecosystems are among the most complex and diverse in the nation. New Jersey's five physiographic regions range from mountainous areas in the Valley and Ridge and Highlands Regions in the north, to the gentle ridges and fertile soils of the Piedmont Region stretching from the Hudson River south through Pennsylvania (**Figure 16**). These regions support northern plant and animal community types. The Inner and Outer Coastal Plain Regions are the most easterly and southern parts of New Jersey. This vast area of sandy, unconsolidated soil is host to diverse habitats including the Pinelands National Reserve, extensive salt marsh and freshwater wetlands, and the Atlantic coast barrier islands and bays. These two regions include nearly 60 percent of New Jersey's land mass and support southern plant and animal community types.

Ecosystem integrity is a measure of the capacity of ecosystems to renew themselves. It is the degree to which

Figure 16



all ecosystem elements — species, habitats and natural processes — are intact and functioning well enough to ensure sustainability and long-term adaptation to changing environmental conditions and human uses.

The loss of a species from an ecosystem in which it naturally occurs changes the interactions among the remaining species, as well as their interactions with their surroundings. For people, the loss of a species may mean lost sources of food, medicine, fiber, building materials and pest control. Many species that were nearly extinct in New Jersey a few years ago, such as bald eagles, also have an aesthetic and cultural value that is difficult to measure in dollars.

Many ecological communities within New Jersey are healthy and vibrant, while others require restoration and improved management to reverse declining environmental health. One sign of the fragile nature of our habitat is the number of threatened or endangered species that live in New Jersey. Species listed on the federal Threatened and Endangered Species list are at peril on the national level. New Jersey has its own Threatened and Endangered Species list. These species are in danger of vanishing from the

state. (Swamp Pink, a flowering wetland plant, is an example of a species that is found on both lists.) In most cases these species are in peril at the regional level as well.

The state has 2,117 known native plant species. Approximately 30 percent of those are categorized as species of conservation concern. In other words, nearly one of every three native New Jersey plants is at risk of becoming increasingly rare. Fifteen percent of New Jersey's native plants are also listed as endangered.

New Jersey is home to 90 mammal species, 79 reptile and amphibian species, and more than 400 fish species. Approximately 325 species of birds inhabit New Jersey. Approximately 1.5 million shorebirds and as many as 80,000 raptors make migratory stopovers in New Jersey each year. Like the plant species, about one-third of the known vertebrate animal species are classified as either rare or endangered in New Jersey. Bald eagles and peregrine falcons are examples of species on both the federal and state Endangered Species lists.

The bog turtle, which was already on the state Endangered Species list, was added to the federal Endangered





*The bog turtle has been added to the federal Endangered Species list.*

Species list in 1997. This affords the species greater protection nationally as well as in New Jersey. Documented bog turtle habitat sites in New Jersey have declined by 60 percent since the 1970s. The Endangered and Nongame Species Program has developed a predictive model to determine the areas most suited as bog turtle habitat. So far, program biologists have found 70 previously unknown bog turtle sites.

To sustain ecological diversity, New Jersey must protect the habitats of the state's plant and animal species. NJDEP offers protection of endangered and threatened species habitat on a

site-by-site basis by regulating some land development activities. However, the strongest protection that can be offered is acquisition of open space. Sometimes endangered or threatened species inhabit small plots of land unconnected and isolated from other existing public open spaces. The state and several nonprofit conservation groups work to identify and protect these unique, ecologically sensitive parcels. The key to protecting endangered and threatened species is to preserve both large and small parcels of open space and link those open spaces with greenway corridors.

Large blocks of open spaces provide the variety of environmental conditions that plant and animal species need to survive and regenerate. For example, some bird species cannot sustain breeding populations in forests smaller than 250 acres. Open space provides opportunities for forests to remain intact and mature. Greenway corridors provide opportunities for wildlife to migrate, nest, find mates and forage for food. Poorly planned land development can fragment forests and interrupt open space corridors. As land development intensifies in New Jersey's rural and suburban areas, more of New Jersey's open spaces become fragmented. The cumulative impacts of development alter the ability of forests and wetlands to filter air and water, and to provide critical habitat.

Many of New Jersey's forest lands are held by private owners. In 1997, there were 273,885 acres of land registered as private forest for tax purposes. The State Forest Service encourages private landowners to preserve and manage these forest lands. Under the guidance of the State Forest Service, owners of 38,273 acres of private forest have taken additional steps to adopt forest stewardship plans for their lands.

Fragmentation of forests and loss of open space has consequences all across New Jersey. For example, in the lower 10 kilometers of the Cape May peninsula, 40 percent of the habitat critical to migratory and residential wildlife has been lost to development over the past 20 years, even though a significant amount of open space is already set aside. Neotropical bird species spend the winter in South America but breed in North America. Many of these species migrate through and rest and feed in New Jersey. Partly as a result of the loss of New Jersey habitat, the world populations of these species are declining. The state Endangered and Nongame Species Program is working to protect migratory raptor and songbird habitats on the Cape May Peninsula. The Cape May Stopover Project provides money and expertise to landowners to manage private land for wildlife and works with local planning boards to pass landscaping and development ordinances sensitive to ecological needs.

### *Flora of the State*

Through its Office of Natural Lands Management, the state directly protects rare species and manages for biodiversity on 31,284 acres in 42 sites.



The purple fringeless orchid (*Plantanthera pramonena*) recently was rediscovered in New Jersey.

The sites range in size from 11 acres up to 3,800 acres. These sites contain some of the state's rarest ecological communities.

During 1997, two historic endangered plant species — the purple fringeless orchid (*Plantanthera pramonena*) and the cut-leaved water-milfoil (*Miriophyllum pinnatum*) — as well as the common water-milfoil (*Miriophyllum sibiricum*), a species believed completely gone from the state, were rediscovered. A new addition to the state's native flora, the small-fruited beggar's-tick, was also discovered in Cape May and added to the Special Plant List. A total of 64 plants previously unrecorded in the state have been discovered since 1984.

## Raptors and Migratory Birds

Several threatened and endangered raptor species have difficulty breeding because of the bioaccumulation of toxic compounds, while others are experiencing improvements in populations. The number of Cooper's hawks has increased statewide. The number of breeding pairs of bald eagles continued to increase this year with a new nest along Alloways Creek, bringing the statewide total to 14 pairs. The recovery, however, is threatened. Toxic contamination is a serious problem for three pairs, while five pairs are threatened by habitat loss and chronic disturbance is disrupting three more pairs.

Piping plovers have also suffered a decline in productivity. The number of breeding pairs fell from 135 in 1996 to 115 in 1997. The key reasons for the decline were disturbance and predation. The Endangered and Nongame Species Program has developed a community-based protection plan that will increase municipal control for protection, thereby lessening the potential for disturbance from recreational activities and land development.

## Marine Life

Important recreational and commercial fisheries in New Jersey depend upon healthy fish populations. More than 50 species of fish and shellfish are harvested commercially in New Jersey. Approximately 175 million pounds of fish, with an approximate dockside value of \$95 million, are harvested annually. Populations of several species, such as striped bass, weakfish and summer flounder, are making significant recoveries. Other species

Numbers of the endangered Cooper's hawk are on the rise.



Jerry Liguori

## What Can You Do?

■ **Contribute** to the protection of endangered species by making sure you "Check-off" for wildlife on line 46 B of your state tax form. Purchase a "Conserve Wildlife" license plate at any DMV agency or by calling (609) 292-6500 for an application.

■ **Learn** about the state's biodiversity by visiting one of the state's interpretive centers such as the Pequest Fish Hatchery (908-637-4125), the Forest Resource Education Center (732-928-0029), or the newest park interpretive centers at Island Beach State Park (732-793-0506) and Washington's Crossing State Park (609-737-0609).

■ **Create** habitat. For information on creating a backyard habitat for migratory and breeding birds, contact the Endangered and Nongame Species Program at (609) 628-2103, or by mail at 2201 County Route 631, Woodbine, New Jersey 08270.

■ **Search** various natural and historic resource-related web sites: [www.state.nj.us/dep/fgw](http://www.state.nj.us/dep/fgw) (Fish, Game & Wildlife), [www.state.nj.us/dep/forestry/home.htm](http://www.state.nj.us/dep/forestry/home.htm) (Community Forestry), and [www.abi.org/nhp/us/nj/](http://www.abi.org/nhp/us/nj/) (Natural Heritage Program).

remain at low levels. Sometimes it is difficult to determine if these populations are depressed for reasons people can control, such as pollution, overfishing and habitat alteration, or if the reasons are natural factors like predation or disease. Fish and shellfish consumption advisories for five species are in effect in various locations in our coastal waters because of pollution.

### Open Space Protection

In the past three years, the number of people citing “the outdoors” as their primary reason for traveling to New Jersey has tripled. Travelers enjoying open spaces and wildlife account for 6 percent of all overnight trips to New Jersey. Another 12 percent of travelers come to enjoy the beaches. Fishing, hunting and wildlife viewing have an annual economic value of \$1.2 billion to the state. Heritage tourism (tourism that incorporates visits to historic sites) has an annual economic value of \$413 million.

The travel and tourism economic sector in New Jersey is valued at \$24.6 billion yearly and is projected to expand at least 31 percent over the next decade. Tourism is among the state’s top three industries for employment and economic impact. Ecotourism and

heritage tourism are two of the fastest growing tourism markets. The continued growth of these markets in New Jersey depends upon the state’s ability to preserve scenic, ecological and historic resources.

State open space is managed largely by the NJDEP. The Division of Parks and Forestry is steward for 53 parks, forests and recreational areas; 57 historic sites and districts; 42 natural areas; marinas; reservoirs; a golf course, and other miscellaneous facilities. These areas total 334,250 acres and attract over 13 million visitors annually. The Division of Fish, Game and Wildlife manages 107 Wildlife Management Areas, totaling 254,000 acres.

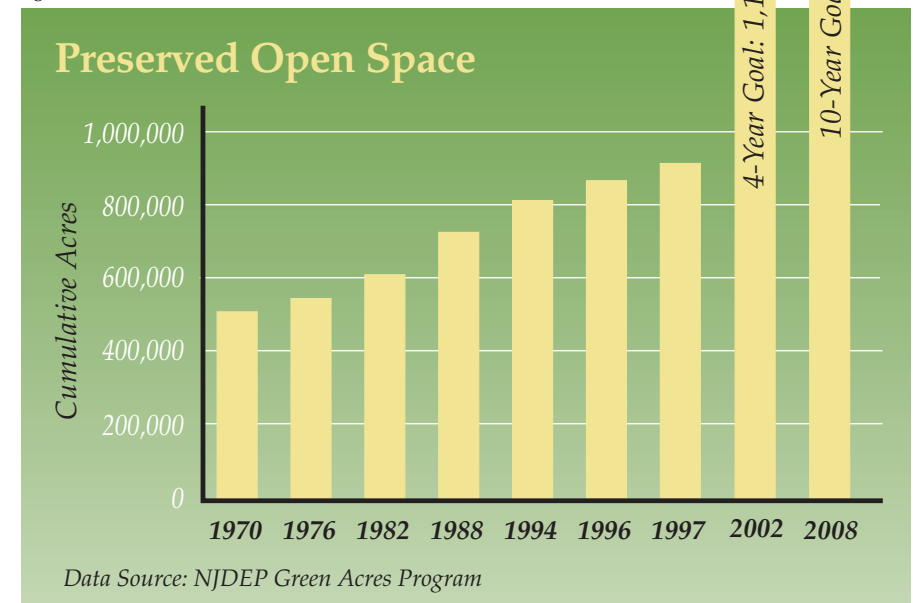
New Jersey’s voters have long been supportive of protecting open space. Over the past 35 years, New Jersey’s voters have overwhelmingly approved nine Green Acres bond issues, totaling over \$1.4 billion, to fund land purchases. To date, over 390,000 acres have been purchased for preservation by state, county, municipal and nonprofit open space programs. In 1997, the Green Acres state acquisition program purchased 13,467 acres at a cost of \$29.8 million. Another \$62.1

million was approved for local open space projects for preservation of approximately 4,800 acres. As of 1998, New Jersey has 920,000 acres of permanently protected open space, including lands managed by federal, state and local governments, interstate agencies and nonprofit organizations, and lands protected under the Department of Agriculture’s Farmland Preservation Program.

Strong public opinion has prompted municipal and county governments to take leadership in preserving lands within their communities. In

November 1998, voters in 45 towns and six counties approved local initiatives for open space related spending. Voters have dedicated funds for open space in 13 counties and 98 municipalities. The public itself has placed open space at the center of its vision for the future of New Jersey.

Figure 17





## *An Open Space Goal Is Established*

In her inaugural speech in January 1998, Governor Christine Todd Whitman set an ambitious open space goal for New Jersey. The Governor launched an initiative to preserve a million additional acres of open space over the next 10 years, with the first 300,000 acres to be preserved before she leaves office in 2002.

The goal of preserving a million more acres of open space was recommended by the Governor's Council on New Jersey Outdoors, a task force established by Governor Whitman. The Council conducted public hearings and took a comprehensive look at the preservation needs for ecological diversity, watershed protection, greenway corridors, conservation of farmland, historic preservation and recreational open space.

When the Council made its recommendations the state had 886,000 acres of open space already preserved, so preserving an additional million acres would result in a 10-year goal of 1,886,000 acres (see Figure 17).

On November 3, 1998, by a two-to-one margin, New Jersey voters showed their support for the Governor's initiative and approved a constitutional dedication of \$98 million of annual funds and \$1 billion in bond financing to preserve farmland, open space and historic resources.

*Meadow of goldenrod, Middlesex County*



J.J. Raia

## *What Can You Do?*

■ **Go outdoors.** Go for a hike or a bike ride, spend the day at the beach or picnic beside a lake. Glimpse a migrating hawk, fish for trophy-size trout or canoe down a sparkling stream. Enjoy the natural beauty of New Jersey.

■ **Volunteer.** Volunteers are the indispensable friends of parks, forests, natural areas, historic sites and interpretive centers. Volunteers count migrating birds, build protective fencing on dunes, provide educational programs, write newsletters, garden, restore historic sites, re-enact military history, clear trails, and lead hikes. For information on volunteer opportunities, write to the Division of Fish, Game and Wildlife or the Division of Parks and Forestry at PO Box 400, Trenton NJ 08625.

■ **Save open space in your area.** Find out if your town has an Environmental Commission to advise on managing natural resources. If your town doesn't have an Environmental Commission, call the Association of New Jersey Environmental Commissions (973-539-7547) to learn how you can help save open space in your area.

■ **Vote** to voice your opinion on open space preservation ballot initiatives.





# Waste

*Goal: Evolve the current system of pollution control into a system that prevents the generation of pollution. Maintain an integrated waste management system that ensures minimized waste generation and disposal; maximizes reuse and recycling; guards against future contaminated sites; and provides long-term capacity assurance that is protective of human health and the environment. Eliminate or reduce the risk to human health and the environment from known contaminated sites.*

*The New Jersey Performing Arts Center, constructed on a former brownfield site in Newark David Street, courtesy of the New Jersey Performing Arts Center*

*A view of the tomato production area inside the Burlington County Research and Demonstration Greenhouse, which is heated by methane gas from the county landfill  
Courtesy of the Burlington County Solid Waste Office*

# Pollution Prevention

Increasing efficiency while reducing emissions has become a fundamental goal of many businesses and manufacturers in New Jersey. Through the use of innovative technologies and pollution prevention initiatives, alternatives now exist for businesses seeking to reduce the amount of toxic

materials they generate, use and ultimately need to dispose of. Pollution prevention results in more efficient production processes and safer products. By reducing quantities of waste that require treatment and control, manufacturers avoid the costly disposal of hazardous waste, simplify the process of complying with regulations and reduce pollution.

Studies of the New Jersey Pollution Prevention Program have found that economic competitiveness and environmental protection go hand-in-hand. For every dollar spent by industry and government on pollution prevention planning, industry is projecting cost savings of between three and eight dollars.

Laws requiring public disclosure of chemical releases by industry are an important factor in prompting industries to cut emissions dramatically. There has been a marked and consistent decline in total releases and transfers from manufacturing facilities over the past seven years (**Figure 18**). Improved treatment and control systems, increased recycling and pollution prevention activities account for these reductions.

New Jersey manufacturing industries achieved the public policy goal of a 50 percent statewide reduction in toxic waste, or “nonproduct output,” by 1994 (**Figure 19**). These same industries have also significantly reduced the amount of toxic chemicals needed to make household and industrial products. Between 1991 and 1994, the amount of waste generated by all U.S. manufacturers increased by 3.5 percent, while the amount of waste generated by New Jersey manufacturers decreased by 34 percent. A likely reason for the reductions seen in New Jersey, but not in the United States as a whole, is the sharp focus on pollution prevention in New Jersey since the late 1980s. These changes appear to be independent of changes in the state’s economy as a whole.

Figure 18

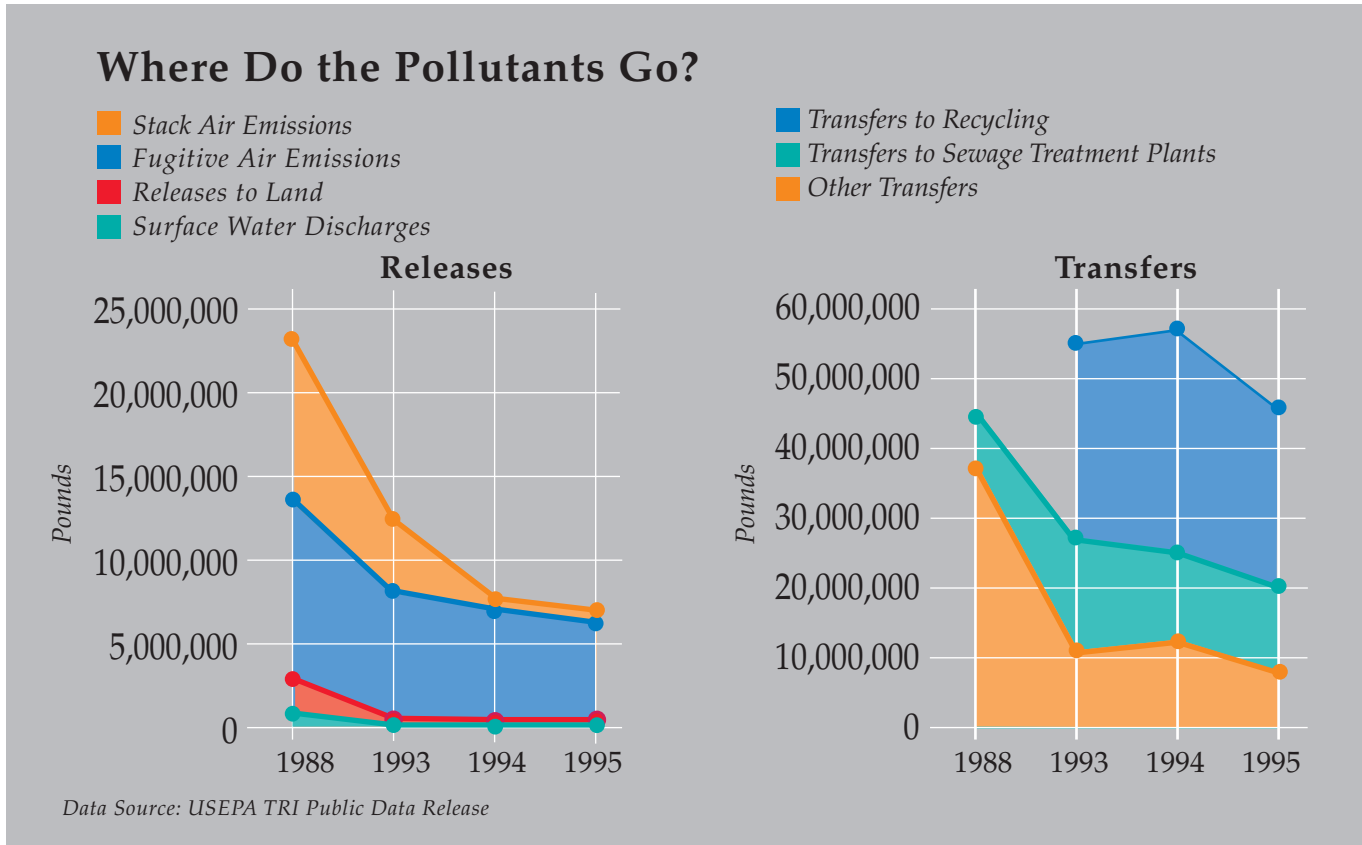
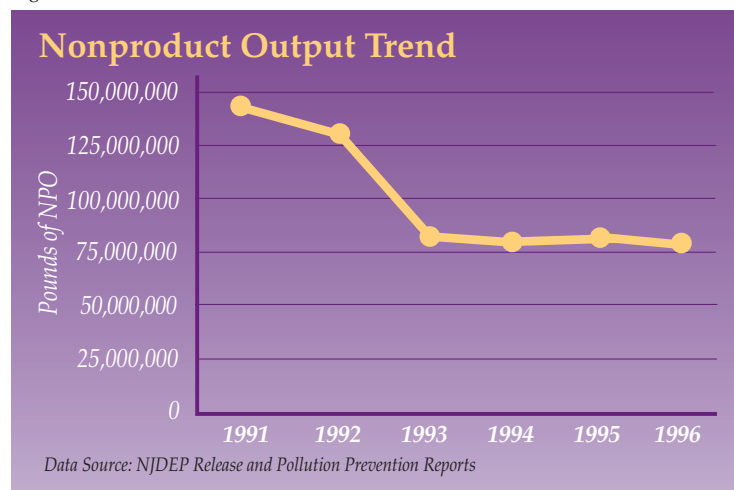




Figure 19



The New Jersey Pollution Prevention Act mandates pollution prevention planning for regulated industries but, unlike other regulatory programs, implementation is voluntary. The planning program requires hundreds of New Jersey manufacturing companies to develop materials accounting information. Facilities conduct a “materials accounting” to determine the amount of chemical that entered the facility and then subtract the amount of chemical that left the facility as either product or waste. The amount that is left over or missing is pollution that can be reduced by implementing pollution prevention initiatives.

Studies of the planning program have shown not only significant

particularly successful at nonproduct output reduction compared to other industrial sectors in the state.

Many programs in New Jersey encourage deployment of new technologies that allow businesses to reduce toxics and other waste products by operating more efficiently. New Jersey works closely with the business community, other states and in some cases other countries to solve environmental problems and develop new technology. New Jersey is a national leader in maximizing the availability of information about innovative environmental technologies and encouraging their commercialization and use. Currently, New Jersey has innovative technology partnerships with Califor-

nia, Illinois, Massachusetts, New York and Pennsylvania, as well as international environmental technology agreements with Israel, Thailand, France and Canada.

## Waste Management

The citizens of New Jersey currently produce over 16 million tons of solid waste a year. Of that, New Jersey residents currently recycle over 10 million tons a year. That translates to each citizen generating approximately 2 tons of solid waste a year. These numbers include industrial and commercial waste as well as municipal solid waste (garbage). One of the state’s main goals is “source reduction,” the term for minimizing the amount of solid waste created in the first place.

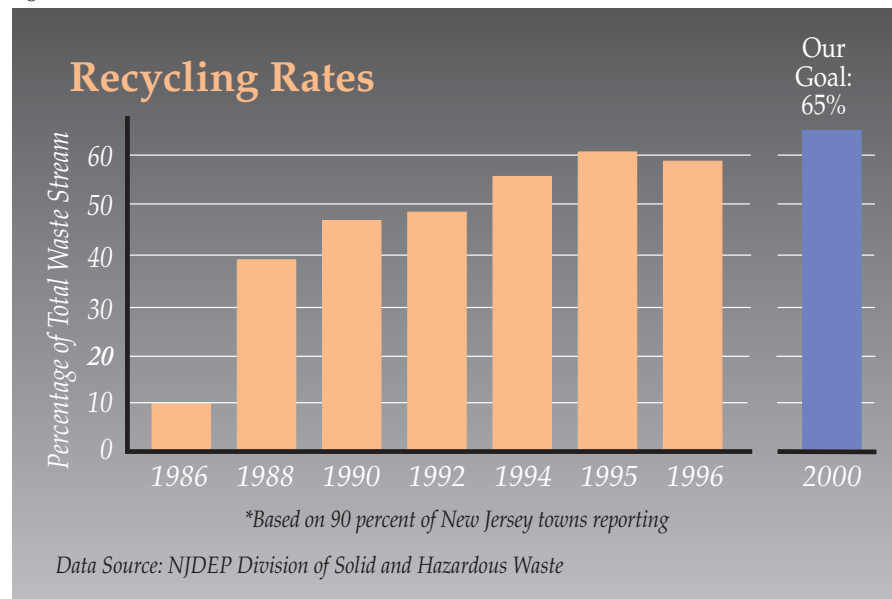
NJDEP works with county and municipal government programs to encourage source reduction and enhance recycling efforts. Among these initiatives are education programs on yard waste management, special household hazardous waste collection days and programs to encourage the purchase of products made with recycled materials.

New Jersey has achieved its goal of recycling 60 percent of the total waste

stream by 1997. It also has come close to its goal of recycling 50 percent of the municipal waste stream. When the state originally set its recycling goal there were established markets for only paper, glass and aluminum cans. Many county and municipal recycling programs now collect plastics, tin and bimetal cans, white goods (e.g., refrigerators), used motor oil, yard waste and other materials not collected in the past. New Jersey has now set a new recycling goal of 65 percent of the total waste stream by the end of the year 2000 (**Figure 20**), as well as a recommitment to meet the 50 percent municipal waste goal.

The first priority of waste management in New Jersey is to reduce, reuse and recycle as much waste as possible. Landfills, incinerators, transfer stations and other facilities are required to dispose of the remaining waste. When the NJDEP was created in 1970, over 300 landfills were operating in New Jersey with little concern for the environment. Prior to the 1980s, there were also no state-of-the-art incinerators in existence (e.g., existing ones had no air pollution controls and were not used to generate energy). There are now five incinerators and 14 regional, state-of-the-art landfills operating in

Figure 20



New Jersey. These facilities are required by NJDEP to employ the best available pollution controls.

The safe disposal of hazardous waste is a special challenge. NJDEP requires that hazardous waste be identified during shipment. All facilities that generate, transport, treat, store or dispose of hazardous waste must be licensed. NJDEP has established an effective cradle-to-grave tracking system for all hazardous waste shipments. All of these actions, as well as the pollution controls required on hazardous waste management facilities, protect the public from toxic waste.

### Remediating Contaminated Sites

Twenty years ago, passage of the New Jersey Spill Compensation and Control Act set in motion the first concerted effort to control the transfer and storage of hazardous substances and the remediation of contaminated sites. Soil, ground water, air and surface water at these sites may contain harmful levels of contamination. The primary goal in site remediation is to eliminate or reduce risks to human health and the environment from known contaminated sites.

The term “remediation” includes all activities necessary to identify the source, nature and extent of contamination, and to implement a cleanup action if necessary. Remediation addresses a wide variety of contaminated sites, ranging from leaking underground home heating oil tanks to large abandoned industrial sites with widespread contamination of soil and ground water. The number of sites with soil contamination and the number which are now considered remediated are used as indicators of environmental progress.

In July 1994, there were 6,070 known contaminated sites in New Jersey. By September 1997, the number had grown to 8,937. The increase is significant, but it is important to remember that identifying a contaminated site is the first, crucial step needed for NJDEP to begin the cleanup of contaminated soil and ground water. As of July 1994, 9,326 sites had been cleaned up or the investigatory process was completed and no cleanup was necessary. By September 1997, this number had risen to 15,815 (**Figure 21**).

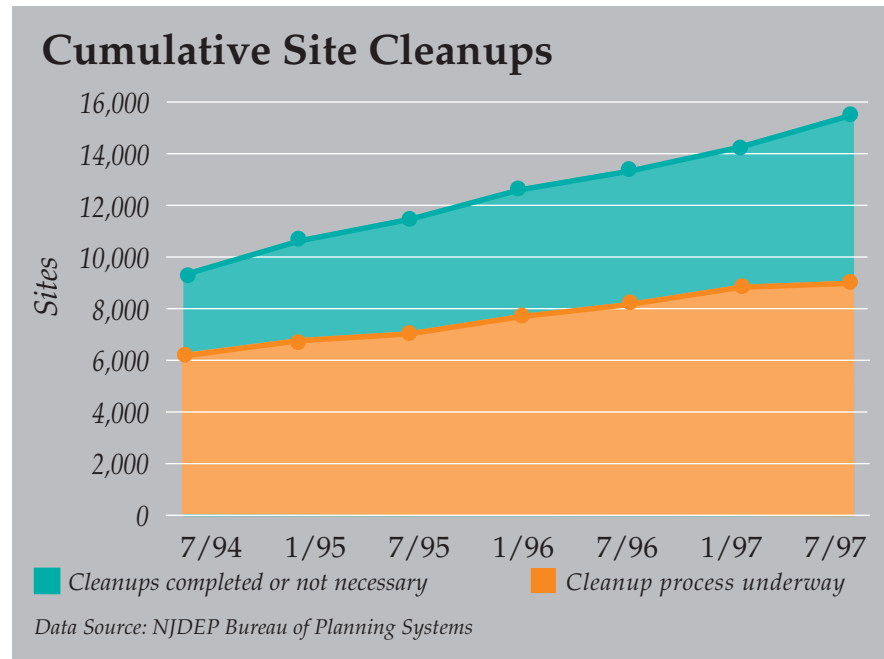
Remedial action can involve the removal of the source of contamination and decontamination of soil and water to the degree required to allow future

use of the site. Often, the remediation of a site involves capping the contaminated area, restricting future use for that property or both. One such restriction is the designation of Classification Exception Areas (CEA). These are defined, mapped areas where ground water quality standards are exceeded. A total of 495 CEAs designated during the course of remediation (of approximately 642 known CEAs) have been mapped on NJDEP’s Geographic Information System. Mapping the location and extent of the CEAs will prevent unsafe use of the ground water in that area.

Regulations passed in 1997 require electronic submission of all data related to the remediation of a contaminated site. Electronic data submission will enable the automatic generation of maps to aid in visualizing contaminant conditions. This information can assist in the site decision-making process.

Streamlining the cleanup process under NJDEP’s Voluntary Cleanup Program has provided greater incentives for private parties and local governments to remediate contaminated sites. Since 1994, these parties have signed 5,648 voluntary agreements to conduct various remedial

Figure 21



activities at tainted sites. Programs offer loans or grants to upgrade or remove underground storage tanks. Municipalities can receive assistance with investigating, cleaning up or closing landfills. The 1997 Brownfield and Contaminated Site Remediation Act created a fund to reimburse developers who return a previously contaminated property to viable, productive use.

New Jersey is focusing much of its efforts on encouraging the cleanup and redevelopment of brownfields —

abandoned or underutilized contaminated sites. Returning these contaminated properties to viable, productive uses not only stimulates economic growth in the state but also protects the environment.

DEP's objectives in brownfield redevelopment are to help private parties through the cleanup process in a timely and consistent manner, assist interested parties by directing them to state programs where funding may be available and provide the certainty required to quantify costs.

## What Can You Do?

- **Participate** in your local recycling program at home and in the workplace.
- **Purchase** products containing recycled-content materials. This increases demand for recyclables placed at the curb, creating value for these materials, stimulates local economic growth and closes the recycling loop.
- **Practice environmental shopping.** Purchase products that are durable, reusable or are packaged in bulk. Less packaging means less waste for disposal.
- **Leave** your grass clippings on the lawn when you mow. These clippings fertilize your lawn as they decompose. Not bagging them helps reduce the amount of yard waste at the curb for trash pickup.
- **Switch** from chemical-type household cleaners to natural products, like soap and water. A vinegar and water mixture works well as a window cleaner.
- **Report** discharges of potential pollutants, and any suspicious activity or motor vehicle accidents involving potential pollutants, to the NJDEP 24-Hour Hotline at (609) 292-7172.
- **Call** the New Jersey Right-to-Know Program at (609) 984-3219 for information on specific chemical substances.
- **Find out** whether your local industry has made any reductions in emissions. EPA's web site includes Toxic Release Inventory (TRI) data on the type and quantity of toxic chemicals that are emitted from industrial facilities across the nation. Look for it at <http://www.rtk.net/>.
- **Become informed.** Visit the NJDEP Site Remediation Program and Solid and Hazardous Waste Program web sites at <http://www.state.nj.us/dep/srp> (site remediation) and <http://www.state.nj.us/dep/dshw/recycle> (solid/hazardous waste).
- **Attend public meetings** in your community regarding cleanup plans for contaminated sites to provide state and federal officials with appropriate guidance from a local perspective.



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## LOOKING FORWARD

To continue our environmental progress, as well as meet remaining and new challenges in New Jersey's environment, NJDEP has embarked on an innovative environmental management system which strives to set clear environmental goals and develop better measures to evaluate our progress in meeting our targets.

The system emphasizes management for environmental results and seeks flexible approaches to achieve our long-term goals. This new management approach aims to involve all of our partners — including the public, regulated parties, the environmental community, other state agencies and the federal government — in even more meaningful ways to set New Jersey's environmental goals and employ the best strategies to achieve them.

NJDEP is developing and implementing this new environmental management system through its participation in the National Environmental Performance Partnership System (NEPPS) and through its Strategic Planning process, both of which emphasize results-based management. Results-based management will provide additional measures of progress for future reports on the state of the environment and is intended to assist NJDEP in evaluating its strategies based on measured environmental outcomes. In these ways, we hope to become increasingly accountable to our public in terms of the environmental results achieved, and provide a greater public awareness of the quality of New Jersey's environment and our collective progress in maintaining and improving it.

*Barnegat Lighthouse, Ocean County  
Walter Choroszewski*



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State of New Jersey

Christine Todd Whitman, Governor

New Jersey Department of Environmental Protection

Robert C. Shinn, Jr., Commissioner

## Acknowledgments and Comments

This report was prepared by the members of the NJDEP Steering Committee for New Jersey's implementation of the National Environmental Performance Partnership System (NEPPS), co-chaired by Leslie McGeorge (Division of Science and Research) and Bryan Ianni (Environmental Regulation), as well as additional key NJDEP contributors. The members gratefully acknowledge the particular effort of Alena Baldwin-Brown, and the reviews by Communications Director Peter Page, NJDEP's Management Team members and the Green Mountain Institute for Environmental Democracy.

The NJDEP welcomes comments on this report and suggestions for future reports on the state of New Jersey's environment. Comments can be submitted to:

NJDEP, Division of Science and Research

P.O. Box 409, Trenton, New Jersey 08625-0409.

*Cover Photo of Island Beach State Park, Ocean County, by J.J. Raia*